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SALIENCE OF BELIEFS AND ATTITUDES

On the Salience and Strength of Beliefs and Attitudes

Abstract

Sets of 16 beliefs about the consequences of each of six leisure activities were selected in a pilot study by means of free elicitation. The beliefs varied in salience (salient versus nonsalient), valence (positive versus negative), and type (instrumental versus affective). In the main study, 69 college students expressed their agreement with each belief, evaluated the consequences involved in the beliefs, and rated each leisure activity on four evaluative scales as a standard measure of attitude. The latencies of these responses were used to assess accessibilities of beliefs and attitudes in an effort to quantify degree of salience. Accessibility of beliefs was found to increase significantly with frequency of elicitation in the pilot study (salience) and with the judged favorability of the consequences. Salience was further found to be related to degree of agreement and extremity of evaluation. It was concluded that belief salience is multidimensional, involving the strength with which the belief is held, favorability and extremity of evaluation, and ease of retrieval from memory. Accessibility was also found to moderate the correlation between beliefs and attitudes posited in the expectancy–value model of attitude. The correlation between a given belief and the direct attitude measure increased with the belief's accessibility, and the correlation between a measure of attitude based on the set of salient beliefs and the standard attitude measures increased with the accessibility of the attitude.

Perhaps the most widely accepted theory of attitude, the expectancy–value (EV) model, assumes that attitudes are based on expectations or beliefs concerning the attitude object. One of the first and most complete statements of this model can be found in Fishbein's (1963, 1967) summation theory of attitude, although a somewhat narrower version was proposed earlier by Rosenberg (1956). In Fishbein's theory, people's evaluations of, or attitudes toward, an object are determined by their salient beliefs about the object, where a belief is defined as the subjective probability that the object has a certain attribute (Fishbein & Ajzen, 1975). The terms "object" and "attribute" are used in the generic sense and they refer to any discriminable aspect of an individual's world. For example, a person may believe that there is a 70% chance that mountain climbing causes physical injury. The belief object, "mountain climbing," is linked to the attribute, "causes physical injury," with a subjective probability of 0.70.

Each belief thus associates the attitude object with a certain attribute. According to the EV model, a person's overall attitude is determined by the subjective values or evaluations of the attributes associated with the attitude object and by the strength of these associations. Specifically, the evaluation of each attribute contributes to the attitude in direct proportion to the person's subjective probability that the object has the attribute in question. The basic structure of the model is shown in Equation 1, where A is the attitude toward some object, b_i is the strength of the belief (the subjective probability) that the object has attribute i, e_i is the evaluation of attribute i, and n is the number of beliefs associated with the object.

$$A \propto \sum_{i=1}^{n} b_i e_i \qquad [1]$$

People can, of course, form many different beliefs about an object, but it is assumed that they can attend to only a relatively small number (perhaps 5 to 9) at any given moment (see

Miller, 1956). It is these *salient* beliefs that are considered to be the prevailing determinants of a person's attitude. The study reported in the present article is concerned with the nature and measurement of salient beliefs, and with the role they play in relation to the overall evaluation of the attitude object.

In past work with the expectancy–value model of attitude, it has been recommended practice to conduct a pilot study in which salient beliefs about a given attitude object are elicited in a free-response format (see Ajzen & Fishbein, 1980). For example, when the object in question is a person or group of people, salient beliefs are elicited by asking respondents to list the characteristics, qualities, and attributes of the person or group. Similarly, when the attitude object is a behavior, such as mountain climbing, the respondents can be asked to list the advantages and disadvantages of mountain climbing, and anything else that comes to mind when thinking about engaging in this activity. The particular beliefs listed by a given respondent are considered to be that person's salient beliefs, and the most frequently mentioned beliefs in the pilot sample constitute the set of beliefs salient in the research population, termed *modal* salient beliefs (Fishbein & Ajzen, 1975). Most research with the summation model has relied on the frequency of elicitation method to identify modal salient beliefs, the focus of the present investigation.

Once the set of salient beliefs has been identified, it is possible to assess, which respect to each belief, how strongly it is held and how positively or negatively its attribute is evaluated. Belief strength is typically measured on a seven-point semantic-differential-type scale, with endpoints defined as *probable–improbable* or *likely–unlikely*; and attribute evaluations are usually obtained by using the same type of scale with *good–bad* or *desirable–undesirable* as endpoints. For example, the belief statement "Mountain climbing exposes one to physical danger" could be

rated on the *likely–unlikely* continuum, and the evaluation of the attribute "being exposed to physical danger" could be rated on the *good–bad* dimension.

In accordance with the EV model, a measure of attitude can be obtained by computing the products of belief strength and attribute evaluation, and summing the products across all salient beliefs. This measure can be compared with any other measure of the same attitude, for example, a Likert scale or an evaluative semantic differential. In comparisons of this kind, attitude scores obtained by the standard scaling procedure are viewed as criteria against which to evaluate the validity of scores derived from salient beliefs.

Essential to the summation model of attitude is the stipulation that all salient beliefs, and only salient beliefs, be considered. Responses to any set of carefully selected belief statements can be used to *assess* an attitude, but to gain an understanding of the factors that *determine* the attitude, it is necessary to examine salient associations to the attitude object (Fishbein, 1963; Fishbein & Ajzen, 1975). According to the summation model, the overall evaluation of an object at a given point in time (i.e., the attitude toward the object) is formed on the basis of information readily available in memory, that is, on the basis of salient beliefs about the object. It is thus important to have available a valid procedure for identifying the set of beliefs that are salient for a given individual or in a given population. Although the free elicitation method of identifying salient beliefs has met with considerable success (see Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), it is not without limitations. Perhaps most obvious, no clear criterion exists for deciding on a cut-off point in the sequence of elicitation. Given sufficient time, a person can produce an indefinite number of beliefs about virtually any object or issue, but presumably only the first few were initially salient. It is unknown at which point people stop emitting salient beliefs and begin listing beliefs that were not salient prior to the elicitation session. Similarly, in the construction of a set of modal salient beliefs for a given population, the cut-off criterion is rather arbitrary. To be included in the modal set, an investigator may

require that a belief be mentioned by at least half the respondents in the pilot sample, by 75% of the respondents, or by any other proportion of respondents. Alternatively, it might be required that the beliefs included in the modal set account for a certain percentage, perhaps 50%, of all beliefs listed (see Fishbein & Ajzen, 1975). Whichever criterion is adopted, it is to some extent based on an arbitrary decision by the investigator.

The identification problem can be traced in part to the assumption implicit in most applications of the free elicitation method that salience is a discrete property of beliefs, such that a given belief is classified as either salient or nonsalient on the basis of the arbitrary cutoff point, and no degrees of salience are recognized. A moment's reflection reveals, however, that this is neither a necessary nor even a particularly reasonable assumption. In fact, with respect to a given individual, it has been suggested that order of emission can be taken as a rough measure of the degree to which a belief is salient, such that beliefs emitted earlier are located higher in the hierarchy of beliefs and thus are more salient than beliefs emitted later (Fishbein & Ajzen, 1975; Kaplan & Fishbein, 1969). With respect to modal salient beliefs it could perhaps be argued that degree of salience corresponds directly to frequency of elicitation. The present study, however, takes a different approach to the problem of identifying salient beliefs.

To elucidate the issues involved, it is useful to distinguish between two types of probabilities associated with beliefs. The first is the likelihood that a given belief will spontaneously be emitted in a specified period of time. Degree of salience is assumed to be directly proportional to this likelihood. The second probability is subjective; it is the perceived likelihood or confidence that the attitude object has a certain attribute. It may be argued that both, the probability of emission and the perceived probability of an object–attribute link, are a function of *belief strength*; i.e., they are both a function of the strength of the association between the object and the attribute involved in a belief.

Information is fundamental to belief strength. Beliefs are formed and changed on the basis of new information about the attitude object, or on the basis of additional processing of available information. With an increasing amount of information on which to base a given belief, and with more time spent thinking about it, comes greater confidence that the object indeed has—or does not have—the attribute in question. When asked to respond to a belief statement, this confidence is expressed in the probability judgment: a high degree of confidence produces strong agreement or disagreement with the belief statement. Similarly, a belief's likelihood of spontaneous emission—its salience—should also increase with the amount of information on which it is based and with the amount of thought that has gone into it.

Note, however, that strong agreement or disagreement with a belief statement does not always imply a salient or strong belief. Consider, for example, the statement, "White-water rafting cannot be done in a swimming pool." Most people would strongly agree with this statement, yet it is not a belief they are likely to have given any thought to before, and few if any respondents would emit it spontaneously. Conversely, high likelihood of emission does not necessarily imply a strong belief in the sense of strong agreement or disagreement with the belief statement. For instance, in free elicitation of beliefs about mountain climbing, many people spontaneously emit the belief that this activity can make you tired and exhausted, yet most agree only moderately with a belief statement that makes this connection (Ajzen & Driver, 1991).

Questions associated with the strength or salience of beliefs and attitudes have become a major focus of research in recent years (see Bargh, Chaiken, Govender, & Pratto, 1992; Berger & Mitchell, 1989; Doll & Ajzen, in press; Fazio, 1986, 1990; Fazio, Powell, & Williams, 1989; Petty & Krosnick, in press). The above discussion makes clear that to study salience and its relation to belief strength, it is necessary to assess salience not as a discrete property of beliefs but on a continuum that ranges from little or no salience to immediate availability in memory, i.e., high salience. The study reported in the present article was designed to contribute to this

effort by examining the validity and utility of a quantitative measure of belief salience, based on responses latencies. Fazio and his associates (Fazio, Chen, McDonel, & Sherman, 1982; Fazio, 1986) were the first to propose that latencies of responses to attitudinal questions could be used to assess an attitude's accessibility in memory, i.e., its salience. The present study extended this logic to measures of beliefs, and compared the latency method to the frequency-of-elicitation procedure. Several specific hypotheses were tested. (1) Beliefs identified as salient in a given population by the frequency method have lower response latencies than beliefs identified as nonsalient. (2) There is some correspondence between the degree of salience of different beliefs, as measured by response latency, and confidence in the beliefs, as indicated by the degree of agreement or disagreement with the belief statements. (3) A given belief's correlation with a standard attitude measure increases in direct proportion to its degree of salience. (4) The correlation between standard and expectancy–value measures of attitude is particularly strong among respondents with highly accessible attitudes (attitudes with low response latencies), as compared to respondents whose attitudes are less accessible.

Method

Preliminary work was required to select a small number of activities for the main study and to elicit salient beliefs about each of the activities selected. The behavioral domain chosen for this study was participation in the specified leisure activities.

Pilot Study

Participants in the pilot research were undergraduate college students at the University of Massachusetts, the same population later used in the main study (see below for details). In the first phase of the pilot study, 76 participants completed a questionnaire that dealt with 16 leisure activities. Based on reported frequency of participation in each activity during the preceding year (on a 6-point scale from never to over 20 times), the following six behaviors were selected for further investigation: hiking (on foot), mountain climbing, recreational biking, boating

(sailing, canoeing, etc.), downhill skiing, and biking. The leisure activities selected for study were those activities performed by college students that showed a wide range of participation. Although this selection criterion may limit the generalizability of our results, it was necessary for methodological reasons.

Salient behavioral beliefs were elicited from 70 undergraduate students in the second phase of the pilot study. Past research has shown that beliefs about leisure activities can usefully be classified into two types, instrumental and affective (Ajzen & Driver, 1991; Godin, 1987). Accordingly, salient beliefs with respect to each of the six behaviors selected for investigation were elicited by means of two types of questions in different subsamples. For the elicitation of instrumental beliefs, 34 participants were instructed to list the possible costs and benefits of the different recreational activities. To take mountain climbing as an example, two questions were posed: (1) "What are the possible costs or losses of mountain climbing?" and (2) "What are the possible benefits or gains of mountain climbing?" Each question was followed by several blank lines, and the respondents were asked to write one cost or benefit per line, filling as many lines as they needed to list all the costs and benefits that came to mind. They were told that "it is OK for different activities to have some of the same costs or benefits; just list them again." In the second subsample (N = 36), two questions were in a similar fashion designed to elicit affective beliefs. These questions requested that the respondents list the things they liked or enjoyed about each activity, and the things they disliked or hated about the activity.

The elicitation phase thus provided four sets of responses consisting of positive or negative beliefs of an instrumental or affective type. The responses in each of these four categories were separately content analyzed, similar responses were grouped together, and the frequency with which each belief had been mentioned was tallied. Within each response category, the two most frequently mentioned beliefs were selected as the salient beliefs in that category; no salient belief was mentioned by fewer than 30% of the respondents. The only restriction imposed was that

the instrumental and affective beliefs not be the same.[1] In addition, two beliefs in each category that were mentioned by only one respondent were also selected to represent the nonsalient beliefs for that category. This selection procedure resulted in a total of 16 beliefs for each of the six leisure activities, in a 2 (instrumental vs. affective) X 2 (positive vs. negative) X 2 (salient vs. nonsalient) design. The kinds of beliefs obtained in this manner are illustrated in Table 1 with respect to one of the activities, mountain climbing.

Insert Table 1 about here

Main Study

Respondents. Sixty-nine undergraduate students at the University of Massachusetts took part in the main study (52 females and 17 males). The participants were recruited in different psychology classes and received extra class credit for their participation. The students ranged in age from 17 to 40, with a mean age of 19. Although not a random or representative sample of the total student population at the University of Massachusetts, the participants spanned a broad spectrum of the student body. Of the 60 participants who had declared a major, 11 were in psychology, 10 were in management, and 31 majored in a variety of specialties including pre-medical, English, engineering, communication, nursing, education, and sociology. Eight participants failed to provide information about their major field of study.

Procedure. The participants completed a computer-administered questionnaire that was described as dealing with their views concerning outdoor recreational activities. The questionnaire was administered in two small laboratory rooms each containing two computers, and it took between 30 and 50 minutes to complete. Informed consent was obtained immediately after the study had been explained. The participants were then seated in front of

a computer and told to follow the instructions on the screen. At the end of the session they received a written explanation of the study and all questions were fully answered.

Questionnaire. Initial instructions informed the participants that they would be shown a variety of statements about recreational activities, each statement on a separate screen accompanied by several response alternatives. They would reply by pressing the number in front of the alternative that best represented their views.

The questionnaire contained five sections that assessed different constructs. Each section was preceded by instructions informing the respondent about the response scale used in that section and a request to keep the appropriate number of fingers above the response keys. In addition, following Fazio's (1990) recommendation, the participants were asked to keep two things in mind. "First, and above all, be accurate. Don't be in such a hurry to respond that you regret your decision. Second, while being accurate, try to respond as quickly as possible. So, you should try to maximize both the speed and the accuracy of your responses." The computer recorded the response given and, unbeknown to the participant, the response time from presentation of a question to depression of the response key.

Each section of the questionnaire contained a number of items dealing with each of the six recreational activities. These items were preceded by five practice items that used the same response format but dealt with unrelated leisure behaviors (playing tennis, outdoor swimming, back-country camping, salt-water fishing, and snorkeling or diving). Presentation of the five sections was systematically varied to produce four different orders. To obtain an uncontaminated measure of response latencies for salient and nonsalient beliefs, the first section obtained binary belief measures by asking respondents to indicate whether they agreed or disagreed with the various belief statements that had been constructed for purposes of the study. In addition to the initial 5 practice items, the section contained 96 belief statements, 16 statements with respect to each of the 6 leisure activities. The 16 statements consisted of 2 statements for each

of the 8 kinds of beliefs shown in Table 1. The belief statements were presented in random order, with the restriction that items referring to a given activity not follow each other. The same random order was retained across respondents.

The same set of 16 belief statements, presented in a different random order, appeared again in a separate section toward the end of the questionnaire, accompanied by a 5-point belief strength scale: *extremely likely, likely, neither likely nor unlikely, unlikely,* and *extremely unlikely*. This more precise belief measure was needed for the computation of the summary index in the EV model. The binary belief measures at the beginning of the questionnaire was designed to obtain latency scores that would be uncontaminated by time needed to decide between five different response alternatives.

In between the binary and 5-point belief measures were two sections that assessed *evaluations* of the different outcomes associated with each of the leisure activities. These sections again presented the items in different random orders, preceded by 5 practice items. The 5-point response scale in one section was affective in nature (*extremely pleasant–extremely unpleasant*), in the other section it was instrumental in nature (*extremely beneficial–extremely harmful*). For example, one of the affective items asked respondents to evaluate the statement, "Being scared of heights in mountain climbing" on the *extremely pleasant–extremely unpleasant* scale, while the corresponding instrumental item obtaining a rating of the same statement on the *extremely beneficial–extremely harmful* scale. Approximately one-half the participants provided the affective ratings first, followed by the instrumental ratings, and the order was reversed for the remaining participants.

The fifth section of the questionnaire obtained a standard measure of attitude toward each of the leisure activities by means of four 5-point bipolar adjective scales. Each activity was rated on the following scales, again preceded by 5 practice items, with activities interspersed and scales

presented in random order: *extremely foolish–extremely wise, extremely attractive–extremely unattractive, extremely useless–extremely useful, extremely unpleasant–extremely pleasant.* The standard attitudes section appeared after the 5-point belief section for approximately one-half the respondents, while for the other half it appeared immediately after the binary belief section.

The questionnaire concluded by asking respondents to enter their age, sex, and major field of study, and thanking them for their participation.

Results

Belief Latency and Salience

We first tested the hypothesis that beliefs identified as salient by the frequency method have lower response latencies than beliefs identified as nonsalient. In addition, although we had developed no specific expectations, we also examined the effect of belief type (instrumental versus affective) and belief valence (positive versus negative) on response latencies. Since beliefs were assessed by means of binary and 5-point response scales, the analysis had four within-subjects factors with 2 levels each: salient versus nonsalient beliefs, binary versus five-point belief scale, positive versus negative belief valence, and instrumental versus affective belief type.

Because the distributions of response latencies were found to be positively skewed, we followed the practice of Fazio and his associates (Fazio, Chen, McDonel, & Sherman, 1982; Powell & Fazio, 1984) and subjected the recorded latencies to reciprocal transformations. All data analyses were performed on the transformed scores, but for ease of discussion we report the retransformed latencies. We also entertained the possibility that measures of response latency can contain error variance due to individual differences in speed of responding that are unrelated to accessibility (see Fazio, 1990). To test for this possibility, the latencies of the practice items in the different sections of the questionnaire were subtracted from the corresponding belief latencies prior to analysis. The results were unaffected by this adjustment. We present the results of statistical analyses involving the adjusted response latencies, but

because the numerical values of these latencies are difficult to interpret, we use the unadjusted values to report mean latencies.

A 4-way repeated measures analysis of variance was performed on the belief latencies. The four factors were *salience* as established by the frequency method (salient versus nonsalient), *response format* (binary versus 5-point scale), *belief type* (affective versus instrumental) and *belief valence* (positive versus negative). The dependent measure was the mean over 12 belief latencies, 2 beliefs averaged over the 6 leisure activities, in each of the 16 cells of the design. These means are shown in Table 2. Separate analyses of the response latencies for each of the 6 activities resulted in the same pattern across all behaviors.[2]

Insert Table 2 about here

The analysis of variance revealed several significant main effects and interactions. Considering first belief salience, the expected main effect was highly significant: response times, in seconds, were considerably shorter for salient ($M = 2.57$) than for nonsalient ($M = 2.94$) beliefs; $F(1, 68) = 183.50$, $p < .001$. This main effect was tempered by significant interactions between salience and belief valence, $F(1, 68) = 17.91$, $p < .001$, and between salience and belief type, $F(1, 68) = 6.25$, $p < .05$. Examination of the means revealed that the effect of salience was greater for positive than for negative beliefs; the mean latency difference between the salient and nonsalient beliefs was .55 s for positive beliefs and .31 s for negative beliefs. Similarly, the effect due to salience was stronger for the binary belief measure than for the 5-point response scale. In the case of the binary measure, the latency difference between salient and nonsalient beliefs was .50 s, compared to .25 s in the case of the 5-point scale.

Overall, then, the response latency measures validated the selection of modal salient beliefs by means of the frequency method. Although influenced by other factors, the latencies of salient

beliefs, as identified by the frequency method, were always significantly lower than the latencies of nonsalient beliefs.

A second significant main effect was due to belief valence, $F(1, 68) = 103.60$, $p < .001$. Response latencies were substantially shorter for positive beliefs ($M = 2.42$) than for negative beliefs ($M = 3.00$). It appears that, at least in the domain of recreational activities, beliefs that associate an activity with positive consequences are more salient than are beliefs that associate the activity with negative consequences. This latency bias in favor of positive beliefs was modified by a significant interaction with belief type (affective versus instrumental), $F(1, 68) = 21.97$, $p < .001$. The difference in response latencies between positive and negative items was greater for instrumental beliefs (.68 s) than for affective beliefs (.32 s).

The main effects of belief type (affective versus instrumental) and response format (binary versus five-point scale) did not reach statistical significance, but response format had a significant interactions with belief valence, $F(1, 68) = 21.65$, $p < .001$. This interaction was due to the fact that the shorter latencies for positive than for negative items was more apparent when the five-point scale was used (mean latency difference = .59 s) than when the binary scale was used (41 s).

Finally, the three-way interaction involving salience, belief type, and response format was also significant; $F(1, 68) = 10.02$, $p < .01$. The pattern of this interaction is shown in Figure 1. It can be seen that the difference between instrumental and affective beliefs emerged primarily for nonsalient beliefs, but this effect was more pronounced in the case of the binary, as compared to the 5-point response format. Inspection of Figure 1 also reveals a difference suggestive of a main effect for response format.[3] Although not significant [$F(1, 68) = 1.99$, $p < .17$], this difference seems to imply, paradoxically, that response latencies are lower for the five-point than for the binary response scale. Recall, however, that the binary measure was always obtained first, whereas the five-point belief measures appeared toward the end of the

questionnaire. The observed difference is thus likely to reflect a practice effect. Having encountered the various belief statements several times before, participants responded faster at the end of the session.

Insert Figure 1 about here

Belief Salience and Belief Strength

Binary belief measures. Three analyses of variance were performed to examine the effects of belief salience, and of the other independent variables, on the strength with which beliefs are held. First, it was expected that respondents would be more likely to agree with salient than nonsalient beliefs. This follows from the fact that the nonsalient beliefs were mentioned spontaneously by only very few respondents in the elicitation study. To test this prediction, a three-way repeated measures analysis of variance was performed on the binary belief measures which provided a simple index of agreement. In this analysis, an *agree* response was scored +1 and a *disagree* response -1, and these values were averaged over the two beliefs of each kind and over the 6 leisure behaviors. The three factors in the analysis were belief salience, valence, and type. As expected, the results revealed a significant main effect of salience [$F(1, 68) = 149.37$, $p < .001$], such that there was considerably more agreement with salient beliefs ($M = .53$) than with nonsalient beliefs ($M = .23$).

The analysis also revealed significant main effects of belief valence (positive versus negative beliefs) and belief type (affective versus instrumental), as well as a significant three-way interaction between salience, valence, and type of belief. Figure 2 shows the pattern of results. It can be seen that, although significant [$F(1, 68) = 4.42$, $p < .05$], the effect of belief type was very small; there was a tendency for greater agreement with instrumental ($M = .40$) than affective ($M = .36$) beliefs. The three-way interaction [$F(1, 68) = 14.90$, $p < .001$] was due to

variations in this effect for salient versus nonsalient beliefs, and for positive versus negative beliefs. More interesting, there was a strong main effect of belief valence, $F(1, 68) = 431.75$, $p < .001$; respondents were much more likely to agree with positive beliefs ($M = .70$) than with negative beliefs ($M = .06$).

Insert Figure 2 about here

Five-point belief measures. A second analysis concerning belief strength was performed on the five-point belief measure, scored from +2 (*extremely likely*) to -2 (*extremely unlikely*), again involving the independent variables of belief salience, affect, and type. The pattern of results was similar to that obtained for the binary measure, except that the effect of belief type was not significant. The significant main effects showed stronger likelihood ratings for salient ($M = .91$) than nonsalient beliefs ($M = .68$), $F(1, 68) = 107.64$, $p < .001$ and for positive ($M = 1.19$) than negative beliefs ($M = .39$), $F(1, 68) = 209.90$, $p < .001$. The significant three-way interaction [$F(1, 68) = 33.10$, $p < .001$] was again due to minor variations in the effect of belief type for salient versus nonsalient beliefs and for positive versus negative beliefs.

Belief polarization. Another way of defining belief strength is to assess extremity, that is, the degree to which belief ratings are polarized. This was done by computing the absolute values of responses on the five-point belief scales. The analysis of variance on extremity scores showed the pattern of results obtained before: significant main effect for salience, affect, and type of belief, as well as a significant three-way interaction. The mean polarization was 1.20 for salient beliefs versus 1.02 for nonsalient beliefs, $F(1, 68) = 149.37$, $p < .001$; it was 1.23 for positive beliefs as opposed to .94 for negative beliefs, $F(1, 68) = 122.39$, $p < .001$; and it was 1.13 for instrumental beliefs versus 1.09 for affective beliefs, $F(1, 68) = 6.00$, $p < .05$.

The significant main effect of belief salience is consistent with a recent finding concerning the effect of repeated attitude expressions (Downing, Judd, & Brauer, 1992). Contrary to the results of previous research (Powell & Fazio, 1984), Downing, Judd, and Brauer reported that expressing an attitude repeatedly increases not only its accessibility in memory but also its extremity. In a similar fashion, the present study shows significant associations between accessibility and salience of beliefs on one hand, and the extremity or polarization of these beliefs on the other.

Correlations. The hypothesis that the strength of a given belief corresponds to its degree of salience was also supported in a correlational analysis. The latencies across the 16 beliefs for each behavior were correlated with the 5-point likelihood measure for those beliefs, resulting in 69 correlations—one for each respondent. Following Fisher's r-to-z transformation, these correlations were averaged across respondents and then retransformed to correlation coefficients. The average correlations ranged from .21 for animal watching to .35 for mountain climbing, with a mean correlation across activities of .27 ($p < .05$).

Belief Salience and Subjective Values of Consequences

An analyses of variance was also performed on the subjective values associated with the different beliefs. Two evaluative measures were available, one instrumental in nature (*beneficial–harmful*), the other affective in nature (*pleasant–unpleasant*), both assessed on 5-point scales. However, since these scales correlated highly (the average correlation across beliefs and leisure activities was .62) and produced the same results, they were combined by computing the average of the two evaluative ratings. The independent variables in the repeated measures analysis were salience of beliefs (salient versus nonsalient), valence (positive versus negative), and belief type (affective versus instrumental).

The means of the subjective values associated with the different kinds of beliefs are shown in Table 3. Perhaps of greatest interest, there was no significant main effect of salience

[F(1, 68) = .02], indicating that salient beliefs were not associated with more positively valued consequences (M = .20) than were nonsalient beliefs (M = .19). However, a significant salience X valence interaction showed that the evaluative ratings of salient beliefs were more *polarized*. The consequences of positive salient beliefs were rated more favorably (M = 1.32) than were the consequences of positive nonsalient beliefs (M = 1.05), and the consequences of negative salient beliefs were rated more unfavorably (M = -.92) than were the consequences of negative nonsalient beliefs (M = -.66).

Insert Table 3 about here

The only other significant result of the analysis was the expected main effect of valence, with positive beliefs rated more favorably than negative beliefs [F(1, 68) = 1123.39, $p < .001$], and a significant interaction between affect and type of belief (instrumental versus affective), indicating, as can be seen in Table 3, that the evaluative ratings for instrumental beliefs were more polarized than those for affective beliefs, F(1, 69) = 227.64, $p < .001$.

Relations Between Beliefs and Attitudes

Salience of beliefs. Two summative belief indices were computed with respect to each of the leisure activities, one based on the 8 beliefs that had been identified as salient in the pilot study, the other on the 8 nonsalient beliefs. Recall that with respect to each belief, respondents provided measures of belief strength and of subjective values associated with the activity's consequence. For purposes of this and subsequent analyses, only the 5-point (*extremely likely–extremely unlikely*) belief scale was used, and the subjective value was again the average of the two evaluative ratings. The likelihood and value ratings were scored in a bipolar fashion from -2 to +2, multiplied with each other, and summed across the set of 8 salient or 8 nonsalient beliefs.[4]

A standard measure of attitude toward each of the six leisure activities was obtained by averaging responses to the four evaluative bipolar adjective scales on which each of the activities had been rated. The correlations between this standard attitude measure and the two expectancy–value attitude measures are shown in the top half of Table 4. Although the differences in correlations involving salient and nonsalient expectancy–value measures were small (the mean correlation was .59 for salient beliefs and .54 for nonsalient beliefs), five of the six differences ($p < .05$ by sign test) were such that the index based on salient beliefs correlated more highly with the standard measure than did the index based on nonsalient beliefs. Only with respect to hiking was there a small difference in the opposite direction.

Insert Table 4 about here

The observed differences between the EV indices involving salient and nonsalient beliefs can perhaps in part be accounted for by differences in reliability. Alpha reliability coefficients for the index based on salient beliefs ranged from .62 for skiing to .78 for animal watching, with an average alpha of .70. For the index based on nonsalient beliefs, the alpha coefficients ranged from .48 for animal watching to .74 for skiing, and the average reliability coefficient was .62. With respect to the 4-item standard measure of attitude, alpha coefficients ranged from .72 for boating to .91 for animal watching, with an average coefficient of .84.

The bottom half of Table 4 shows the correlations between the expectancy–value and standard attitude measures after correction for attenuation due to unreliability. It can be seen that the differences between salient and nonsalient EV indices are generally smaller, although still in favor of the salient belief index for four of the six leisure activities (not significant, by sign test). On the average, the disattenuated correlations were .81 for the index based on salient beliefs versus .78 for the index based on nonsalient beliefs.

The belief latency measures also permitted examination of the hypothesis that any single belief's correlation with the standard attitude score would correspond to its degree of salience. This hypothesis was tested separately for the different leisure behaviors. Each belief, using the 5-point likelihood scale, was first correlated with the standard attitude, yielding 16 correlation coefficients. In addition, for each belief the average latency across respondents (on the binary response scale) was computed. Finally, these average latencies were correlated with the correlation coefficients across the 16 beliefs. The results of this analysis provided support for the hypothesis: the more salient a given belief, as defined by its response latency, the better it tended to correlate with the standard attitude measure. The correlations ranged from .16 for boating to .66 for animal watching, and the average correlation across activities was .35 ($p < .05$).

Salience of attitudes. Latency measures were available not only for responses to the different belief statements but also for responses to the four evaluative scales that constituted the standard attitude measure. To examine the effect of attitude accessibility, the average over these four latencies was computed and respondents were divided at the median into high and low latency groups. This procedure was repeated for each of the six leisure activities. Separate correlations were then computed within the high and low attitude accessibility subgroups. The correlations compared the standard attitude score to the attitude index based on the eight salient beliefs identified by the frequency-of-elicitation method. The results of this analysis are shown in Table 5.

It can be seen that the correlations between standard and EV attitude scores were substantially stronger when responses to the standard attitude scale were high rather than low in accessibility. The mean correlations across activities were .64 under high attitude accessibility compared to a mean correlation of .54 under low attitude accessibility. Five of the six

differences were in the expected direction ($p < .05$ by sign test); the only exception again occurred with respect to hiking where there was a small difference in the opposite direction.

Insert Table 5 about here

Discussion

By assessing latency of responses to belief statements, the study reported in the present article was able to provide valuable information about the nature of salient and nonsalient beliefs. Salient beliefs, identified by high frequency of emission in the research population, were shown to have substantially lower response latencies than nonsalient beliefs. This finding suggests that salient beliefs are more accessible in memory, and that response latency can be used as an alternative means of identifying the beliefs that are salient for an individual or in a given population. Moreover, response latencies permit easy quantification of the degree of salience for each belief. Using this quantitative measure of belief salience, it was possible to show that the more salient a belief for a given individual, the more that individual tended to agree with the corresponding belief statement.

Salient beliefs, as identified by frequency of emission, were found to differ from nonsalient beliefs in other ways as well. Specifically, frequently emitted beliefs were more likely to produce agreement than beliefs emitted infrequently, and responses to statements concerning the former beliefs were more polarized. In sum, beliefs that are easily accessible in memory, with which people tend to agree, and which they hold with a great deal of strength tend to be the beliefs emitted frequently during free elicitation.

Accessibility of beliefs was also found to be influenced by the other belief dimensions that were varied in the present study. Most dramatically, accessibility was much higher for positive than for negative beliefs; that is, responses to belief statements that associated a leisure activity

with positively valued outcomes were found to have much lower latencies than responses to statements that associated the activity with negative outcomes. It is possible that this effect is related to the finding that respondents were also more likely to agree with positive than with negative belief statements. Past research has shown that, at least with respect to self-referent statements, responses indicating agreement are given more readily, i.e., have lower latencies, than responses indicating disagreement (Gough, 1965; Markus, 1977; Smith & Miller, 1983). Taken together, these findings might be taken to imply that responses to positive belief statements had lower latencies because respondents tended to agree with them more than with negative belief statements. However, and more relevant for the present study, in the case of attitudinal statements, it has been reported that short response times are associated with strong agreement as well as with strong disagreement (Judd & Kulik, 1980). This finding suggests that the strong effect of belief valence on response latency obtained in the present study may not be mediated by differential agreement with positive and negative statements.

The distinction between affective and instrumental beliefs had only a minor effect on response latencies. Responses to instrumental belief items tended to be produced somewhat faster than responses to affective items. There was again a corresponding effect on agreement, such that respondents were somewhat more likely to agree with the instrumental than with the affective belief statements.

Salience and type of belief influenced the subjective values of outcomes associated with the different leisure activities primarily in terms of polarization. The subjective values were more polarized (positive or negative) for salient rather than nonsalient beliefs, and for instrumental rather than affective beliefs.

Finally, the study examined the relations between beliefs and attitudes. Consistent with the EV model, indices formed by summing over the products of beliefs and evaluations correlated significantly with a standard measure of attitude. The correlations between the expectancy–value

and the standard measures tended to be somewhat stronger for the set of salient beliefs than for the set of nonsalient beliefs, although this difference seemed to be due at least in part to the greater reliability of the salient belief index.

At first glance, the fact that an EV measure based on salient beliefs did not correlate much better with the standard attitude scores than did an EV measure based on nonsalient beliefs appears to be inconsistent with the EV model. It should be realized, however, that—as noted in the introduction—attitudes can be assessed on the basis of any set of belief statements, whether salient or not, and a measure based on nonsalient beliefs may well correlate with a standard measure of the same attitude.[5] The difference, according to the expectancy–value model, is that the salient beliefs are the *determinants* of the attitude at the time of measurement. Of course, the correlations available in the present study cannot be used to test the hypothesized causal effect of salient beliefs on attitudes.

Perhaps of greater interest, accessibility of the attitude, as measured by latency of responses to the standard evaluative items, was found to moderate the correlation between the EV and standard attitude scores, such that the summation model was supported better when attitudes were highly accessible. This finding is similar to the effect of attitude accessibility on the attitude–behavior relation: Highly accessible attitudes tend to predict behavior better than less accessible attitudes (Fazio & Williams, 1986).

Conclusions

As a measure of salience, accessibility in memory of beliefs and attitudes turned out to be a matter of some complexity. Assessed through latency of responses to probabilistic items, accessibility of beliefs was found to reflect not only their likelihood of emission in free elicitation, but also degree of agreement with the items as well as their judged positivity (valence). Salient beliefs identified by means of response latency, therefore, tend to involve contents that can be brought to mind easily, that are more likely to be evaluated positively than

negatively, and that the individual finds agreeable. Interestingly, the pattern of results was not quite the same for salience identified by the free elicitation method. Although beliefs identified as salient by this method were more accessible in memory, as indicated by response latency, they were not judged to be more favorable in content. Instead, the subjective values associated with salient beliefs tended to be more polarized, both positive and negative, than were the subjective values associated with nonsalient beliefs. It thus appears that a statement's valence (positive or negative) influences latency of responses to that statement, but that the reverse is not necessarily true. Salient and nonsalient belief statements can be judged to be equally favorable or unfavorable.

As has been evident for some time, salience is clearly a complex, multidimensional construct (see Raden, 1985 and Abelson, 1988 for reviews). Attitude accessibility has been researched extensively in the past, but accessibility of beliefs is a relatively new topic and much less is know about it. The present study makes clear that no single method of identifying salient beliefs is likely to prove completely satisfactory. Response latency measures can provide useful information of a quantitative nature to supplement identification of salient beliefs by the free elicitation method. Besides yielding a quantitative measure, response latency also has the advantage of permitting us to assess not only the salience of specific beliefs about an attitude object, but also the salience of evaluative reactions to the object itself, i.e., of the attitude toward the object. The relation between beliefs and attitudes, specified in the expectancy–value model of attitude, was found to depend in part on the accessibilities of beliefs and attitudes. The correlations between any single belief and the evaluative attitude measure increased with the belief's accessibility, and the correlation between EV and standard evaluative measures increased with the accessibility of the attitudes. In other words, the summation model of attitude seems to work best for individuals with strong, well-formed beliefs and attitudes about the object under consideration.

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Footnotes

1. There was some overlap in the responses elicited by the instrumental and affective questions, but only few of the most frequently mentioned beliefs were the same.

2. No significant or systematic effects were found in this or the subsequent analyses for the order in which the different sections of the questionnaire were presented. Order of presentation is therefore not further discussed.

3. Figure 1 shows unadjusted response latencies. After adjusting for the latencies of the practice items, the difference between 2-point and 5-point formats is less pronounced.

4. The bipolar scaling procedure was validated by means of an optimal scaling analysis which determines the most appropriate scaling of the likelihood and evaluation measures (see Ajzen, 1991; Evans, 1991).

5. In fact, standard attitude scales constructed by means of Thurstone or Likert scaling procedures are comprised of statements constructed by the investigator, statements that usually do not correspond to salient beliefs (see Fishbein & Ajzen, 1975).

Table 1
Examples of Beliefs Varying in Salience, Valence, and Evaluative Type

Salient, positive, instrumental: "Mountain climbing helps you get good exercise and build endurance."

Salient, positive, affective: "Mountain climbing is thrilling, challenging, and exciting."

Salient, negative, instrumental: "By mountain climbing, you take the risk of falling and getting injured."

Salient, negative, affective: "Mountain climbing arouses fear of height."

Nonsalient, positive, instrumental: "Mountain climbing lets you meet people."

Nonsalient, positive, affective: "Mountain climbing lets you experience solitude."

Nonsalient, negative, instrumental: "While mountain climbing, you can be attacked by wild animals."

Nonsalient, negative, affective: "For mountain climbing you have to wear ugly shoes."

Table 2
Mean Response Latencies (in Seconds) by Belief Category

	Binary format				Five-point format			
	Affective		Instrumental		Affective		Instrumental	
Salience	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative
Salient	2.70	2.86	2.38	3.13	2.13	2.56	1.91	2.86
Nonsalient	3.03	3.33	3.13	3.57	2.38	2.78	2.38	2.94

Table 3
Mean Subjective Values by Belief Category

	Affective		Instrumental	
Salience	Positive	Negative	Positive	Negative
Salient	1.32	-.64	1.32	-1.20
Nonsalient	.96	-.51	1.14	-.80

Table 4
Correlations Between Standard and Salient Expectancy–Value Attitude Measures

	Animal watching	Biking	Boating	Mountain climbing	Hiking	Skiing
Uncorrected						
Salient beliefs	.60	.53	.56	.60	.61	.64
Nonsalient beliefs	.51	.50	.54	.52	.62	.58
Corrected for attenuation						
Salient beliefs	.81	.70	.78	.78	.81	.90
Nonsalient beliefs	.77	.67	.78	.76	.90	.75

Note. All correlations are significant at $p < .001$. $N = 69$.

Table 5
Effect of Attitude Accessibility on Correlations Between Standard and Salient Expectancy–Value Attitude Measures

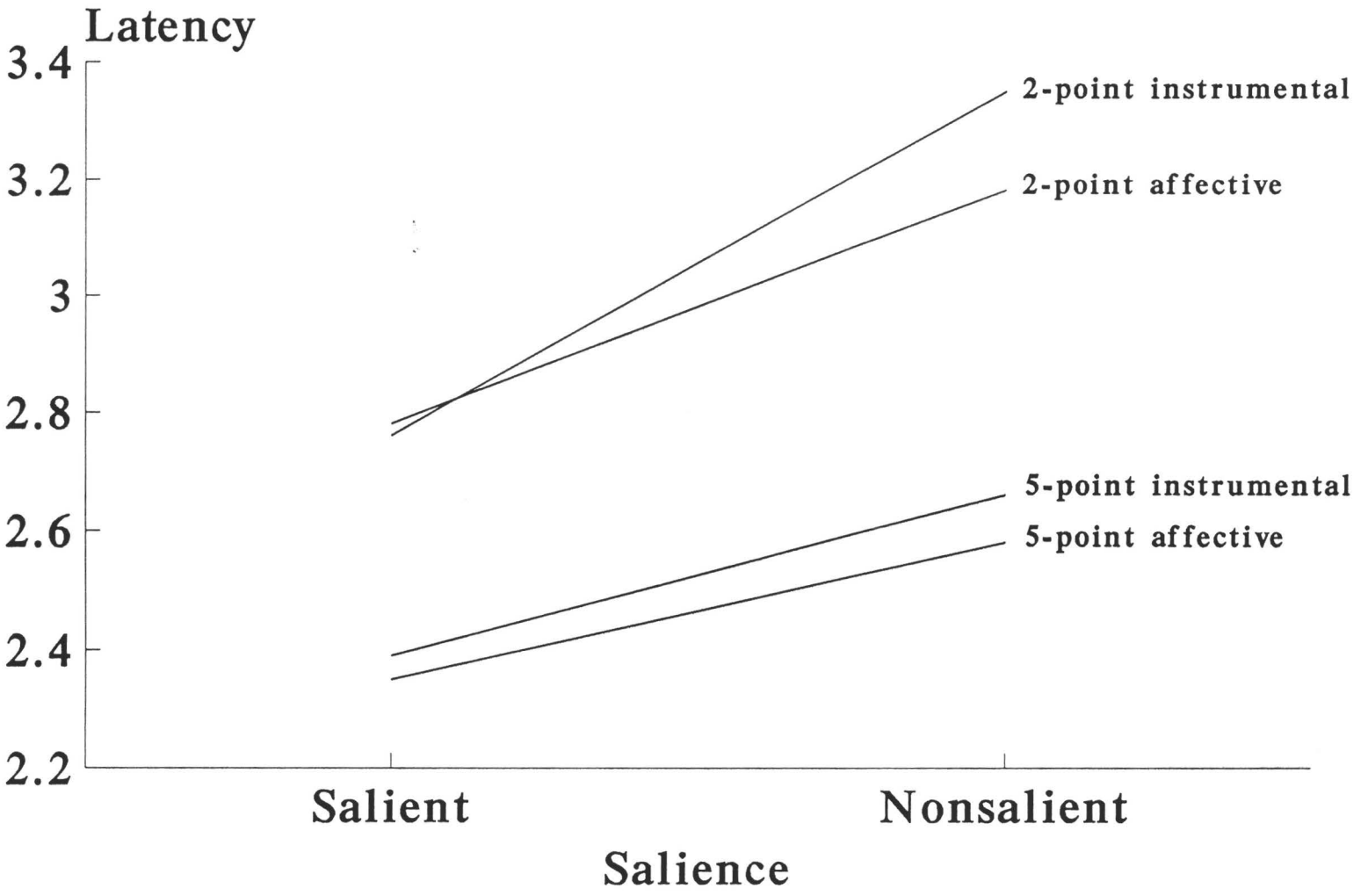
Attitude accessibility	Animal watching	Biking	Boating	Mountain climbing	Hiking	Skiing
High	.65	.55	.60	.66	.59	.74
Low	.49	.53	.52	.52	.62	.55

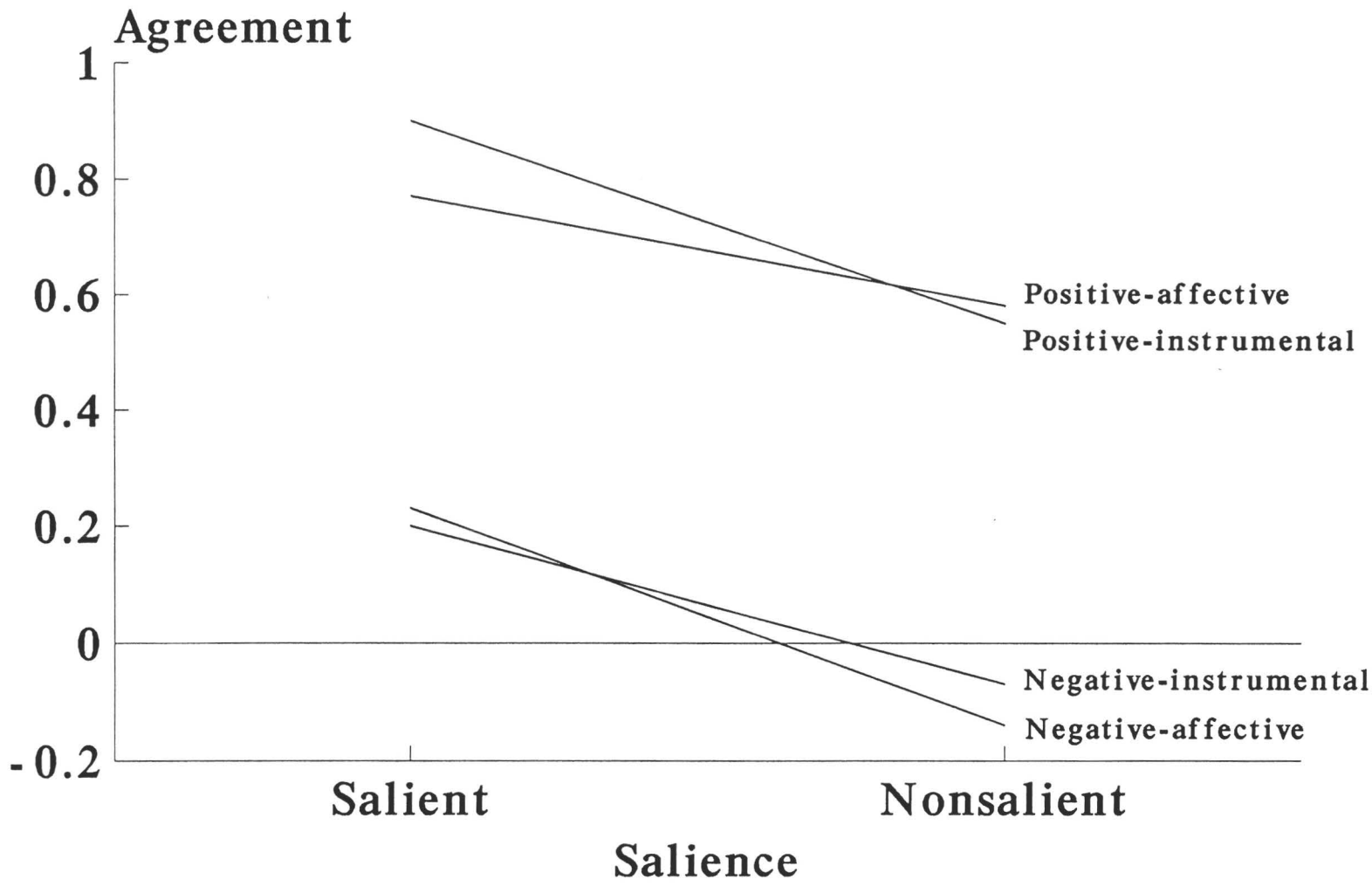
Note. All correlations are significant at $p < .001$. $N = 69$.

Figure Captions

Figure 1. Mean latency (in seconds) of responses to belief statements as a function of belief salience, format, and type.

Figure 2. Mean agreement with belief statements (on binary scale) as a function of belief salience, valence, and type.


Latency
3.4
3.2
3
2.8
2.6
2.4
2.2
2-point instrumental
2-point affective
5-point instrumental
5-point affective
Salient
Nonsalient
Salience


Agreement
1
0.8
0.6
0.4
0.2
0
-0.2
Positive-affective
Positive-instrumental
Negative-instrumental
Negative-affective
Salient
Nonsalient
Salience